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C. L. DAVIS.

PNEUMATIC MUSIC PLAYING INSTRUMENT.

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NO MODEL.

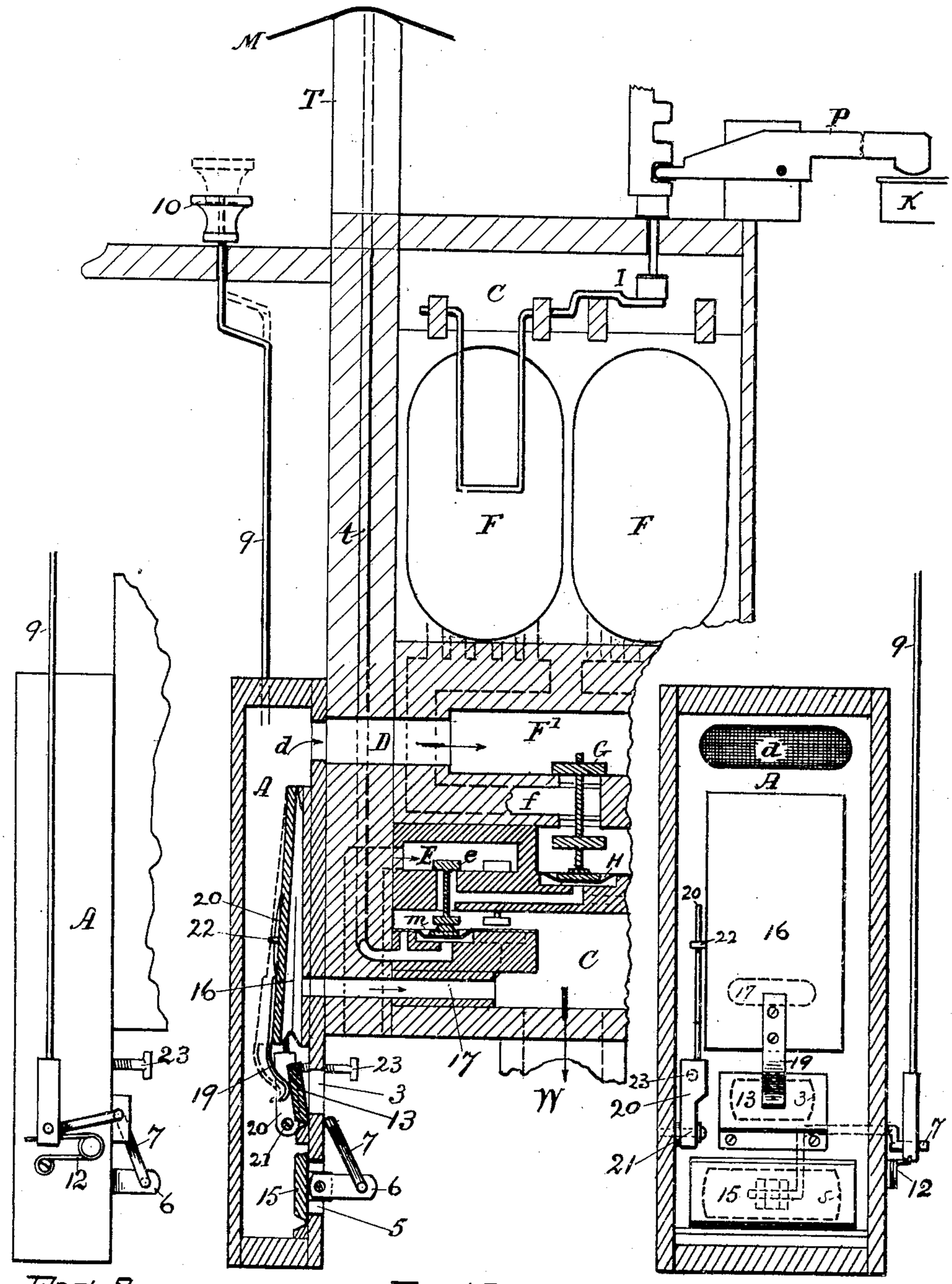

FIG. 2.

FIG. 1.

FIG. 3.

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UNITED STATES PATENT OFFICE.

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PNEUMATIC MUSIC-PLAYING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 769,889, dated September 13, 1904.

Application filed March 29, 1904. Serial No. 200,540. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. DAVIS, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Pneumatic Music-Playing Instruments, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates to improvements in mechanism for controlling expression in automatic piano-players and similar pneumatic music-playing instruments, the means herein described being an improvement more especially applicable in mechanism of the class set forth in Letters Patent No. 736,600, but also capable of successful employment in instruments of general construction.

The object of my invention is to provide a choker or air-regulator appliance that is sensitive, quick, and strong in its action and which will cause the player or power-pneumatics to strike with an approximately equal degree of force, whether under a demand of high tension or low tension of exhaust, at any instant of action, so that said power-pneumatics will not be forced by a vigorous operation of the bellows or wind-inducing apparatus; also, to render the choker, for all conditions of air tension, equally effective in producing uniformity of response under the manipulations of the expression-controlling devices. These objects I attain by the improved construction illustrated in the accompanying drawings, wherein—

Figure 1 represents a vertical section of parts of a music-playing instrument and means embodying my invention. Fig. 2 is a side view of the choker-box, and Fig. 3 is a front view of the choker-box with its front board removed to show the interior.

In the drawings I have illustrated my invention as applied to a pneumatic action of an automatic piano-player of known type, wherein C denotes the pneumatic chest or chamber, from which air is exhausted or withdrawn at W by suitable bellows or means (not shown) to induce suction-currents through the passages in usual manner.

D indicates the inlet-way, through which air is supplied to the power or operating pneumatics F, that work the levers or fingers P by any suitable connections for striking the piano-keys K.

F′ indicates the wind way or leader to such pneumatics; G, the puppet-valves that severally control the passages *f* into the power-pneumatics; H, the secondary pneumatics that work said valves; E, the air-inlet way for supplying the secondary pneumatics; *e*, the valves therefor; *m*, primary pneumatics at the end of the tracker-ducts or pipes *t;* M, the music-sheet, and T, the tracker. All of said parts can be of well-known or suitable construction and need not be herein described in detail.

In accordance with my invention, an air-tight box or inclosing chamber A, having inlet-ports 3 and 5, is arranged over the inflow-passage D, through which air is supplied for operating the power-pneumatics F, and said chamber has an open port *d* from its interior into said inflow-passage. The two ports 3 and 5 are each provided with a valve. Said valves 13 and 15 are hinged to open inwardly from their seats. The valve 13 is herein termed the "regulating-valve," and the valve 15 is the expression-controlling valve. The latter valve is provided with a pivotally-attached link-bar 6, that extends out through the port and is externally connected with a rocker or actuating means 7, which in turn is connected with the finger-button or manipulating-stop 10 by suitable intermediary connection 9. A spring 12, combined with the connections, serves to keep the valve 15 normally open when the button 10 is elevated. Within the chamber A there is a collapsible pneumatic 16. Its interior space, which is separated by its collapsible walls and movable back board or member from the chamber-space A, is connected by a passage 17 with the exhaust-chamber C, so that the movable member of said pneumatic is subjected to the influences of the air-pres-

sures within the inclosing chamber A and within the interior or exhaust chamber C of the instrument or to the same source of power which operates the pneumatics F. The movable member of the inclosed pneumatic 16 is provided with a suitable arm or curved metal finger 19, that engages the valve 13 and controls its action in accordance with the regulative movement of the pneumatic. A resilient tension device or spring 20 is pivoted within the chamber, as at 21, and its resilient arm is engaged with an eye or lug 22 on the movable member of the pneumatic 16 and strained for giving tension thereon in opposition to the internal exhaust. An adjusting-screw 23 is arranged through the wall of the chamber with its end impinging against the spring or its supporting-foot, whereby the tension can be regulated as desired.

The operation is as follows: The valve 15 being closed, the vacuum in chamber C, acting through the connection 17, collapses the pneumatic 16, which closes the valve 13 over port 3. When a note is played, the air from the leader F′ and chamber A is drawn to the power-pneumatic F, and partial vacuum is consequently formed in the chamber or choker-box A. The suction thereof tends to overcome the force of the internal exhaust and to release the pneumatic 16, which in turn allows the valve 13 to open slightly, thereby permitting air to pass into the choker-box and flushing-leader in sufficient quantity to supply the pneumatic F. The more notes that are in operation the greater will be the suction from the chamber A, and the pneumatic 16 will be affected for allowing the valve 13 to open to a greater or less degree, and more or less air can enter, according to the number of power-pneumatics in operation. The inflow-current under these conditions is subjected to the retarding influence of the choking appliances.

By manipulation of the valve 15, through the aid of the finger-button 10 and connections, the choking effect can be varied by closing said valve to a greater or less degree or entirely eliminated by fully opening the valve. Thus various shades of expression can be attained by allowing more or less free entrance of air at the valve 15. The valves being arranged to open inward they move away from their seats without pluck or resistance. By adjustment of the spring 20 the general degree of choking tension can be raised or diminished.

With the construction herein shown and described the pneumatic 16, which controls the regulating-valve, is influenced or acted upon both by the suction of the exhaust in the wind-chest and by the suction due to the draft of air into the power-pneumatics. Consequently the movable member of the valve-controlling pneumatic assumes an equilibrate position that relatively corresponds with the differential requirements of inflow as one or more of the power-pneumatics are put in operation, the valve 13 being accordingly permitted to open more or less as the inflow demand increases or diminishes, so as to admit the proper amount of air for giving uniform potential to the stroke of the power-pneumatics under variations of exhaust and numbers of pneumatics at any instant in operation.

This improved choker mechanism can be employed upon a music-playing instrument and combined with actuating connections, finger-pressible buttons, and pedal-working appliances, substantially such as illustrated in the before-mentioned Letters Patent No. 736,600, or, again, it may be employed with any suitable manipulative connections or attachments.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. In a mechanical music-playing instrument, a choker mechanism comprising an air-tight box or inclosing chamber having two inlet-ports, and a passage into the pneumatic-flushing leader, an inwardly-opening valve for each inlet-port, a collapsible pneumatic inclosed within the chamber, and internally connected by a passage with the exhaust-chamber of the instrument, its movable member provided with an arm that regulates the valve for one port, a spring for expanding said pneumatic, an external actuating means with connections, and a stop or finger button for manually operating the valve of the other port to control expression, substantially as set forth.

2. The combination, with key-playing devices, power-pneumatics for operating the same, and the inflow-passage through which air is supplied to said power-pneumatics; of a close supplemental chamber communicating with the inflow-passway, two inlet-ports opening into said chamber, inwardly-swinging valves for the respective ports, means for operating one of said valves from the exterior, a collapsible pneumatic within said chamber provided with means for closing the other valve, a connection from the interior of said pneumatic with the same source of exhaust as employed for the power-pneumatics, a resistance-spring acting to expand said valve-closing pneumatic, and means for regulating the tension of said spring.

3. In mechanism for the purpose specified, in combination, an exhaustible wind-chest, means for exhausting air therefrom, power-pneumatics, a windway leading thereto, a chamber connected with or forming a part of the windway, an inlet-port in the wall of said chamber, an inwardly-opening valve for regulating the ingress of air through said port, a valve-controlling pneumatic having means for actuating the valve, completely inclosed within said chamber and internally connected by a passage with said wind-chest, said pneumatic having its movable member disposed to be acted upon in one direction by the

suction of the wind-chest exhaust, and acted upon in the other direction by the suction of the air-draft to the power-pneumatics, means for regulating the effective tension of said controlling-pneumatic, and means for admitting and excluding air independent of said regulating-valve.

4. In a pneumatically-operated music-playing instrument, in combination, with playing devices and power-pneumatics for operating the same; an inclosed chamber in connection with the inflow-passage to said power-pneumatics, a port opening into said chamber, an internal valve for said port, means for operating said valve consisting of a collapsible pneumatic within said chamber, the movable part of said pneumatic having an arm that closes the valve, a spring-lever having its foot pivoted to a stationary part, and its resilient arm engaging with the movable part of said pneumatic, an adjusting-screw extending through the chamber-wall and impinging against said spring-lever, and a passage from the interior of said pneumatic connecting with an exhaust-chamber, said pneumatic operating substantially as set forth.

Witness my hand this 22d day of March, 1904.

CHARLES L. DAVIS.

Witnesses:
FRANK C. WHITE,
F. E. BEMIS.